# A Student's Guide to Buying Tools

Advice from Marine Systems Instructors

Welcome to the Marine Systems Program at the Northwest School of Wooden Boatbuilding. This program sets you up for an entry-level role in the marine industry, combining a wide range of topics with hands-on and classroom-based learning. We are excited to support you as you build your skills and get ready for a rewarding career in this dynamic field.

Before arriving on campus, you will need a basic kit of quality tools. This list covers what you will use during the program. As you get hands-on experience, you will likely find new favorites to add to your gear.

Tools are grouped by category: Electrical & Corrosion, Mechanical, Layout, Other Tools, and Personal Protection Equipment (PPE). Since safety always comes first, PPE use is required. If a brand and model are listed, that is the recommended choice—otherwise, go with something that works well for you. Prices are estimates for good-quality tools. You don't need top-of-the-line gear to do great work, but reliable tools will definitely help you get the job done more smoothly and efficiently.

As you build up your tool collection, you will need a way to carry and store everything. When choosing tool storage, think about what a marine technician's day looks like - you will be in and out of vehicles and on and off boats. Choose tool storage that is easy to move around, keeps your tools organized and secure, (so nothing ends up in the water), and protects work surfaces. Soft-sided backpacks or cases are best to avoid damage to boat interior spaces.

If you have any questions, please feel free to contact us. Our email addresses are listed below. We look forward to teaching and coaching you on this adventure and wherever this endeavor takes you.

Respectfully,

Your Marine Systems Program Instructors

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## Electrical & Corrosion Tools

**Tools listed in bold with a yellow background are required.** Other tools listed are recommended, but optional. NWSWB does not recommend a specific tool vendor or supplier. The examples given are representative of a reasonably priced quality tool.

| Tool | Model | Price | Notes |
|---|---|---|---|
| **Digital Multimeter** | Fluke 117 with Test Leads | $235 | Auto-ranging AC/DC multimeter with capacitor & diode test function, and "Low-Z" mode. |
| **Circuit Analyzer** | Extech CT70 | $245 | Powerful tool for diagnosing and troubleshooting AC circuits. Much more functionality than a GFCI/AFCI receptacle tester. |
| **Ratcheting Single-Crimp Tool** | Ancor 703010 (straight)<br>**-OR-**<br>Ancor 703015 (angled) | $37<br>**-OR-**<br>$63 | For installing terminals on wires. There are a lot of similar tools (they must be ratcheting). Some have interchangeable crimping dies for versatility. |
| **Wire Stripper** | Knipex 1262180<br>**-OR-**<br>Klein Katapult (11063W)<br>**-OR-** similar | $54<br>**-OR-**<br>$31 | The Knipex is a pistol-grip wire stripper. The Klein is more of a pliers-style stripper. Very handy for removing insulation from wires smaller than 12 gauge. |
| **NEMA L5-30 Male Plug & Female Receptacle Set** | Journeyman-Pro L5-30PR Set | $33 | A plug and receptacle set of power cord ends to build a 'split cord', used for shore power testing. |
| **Power Cord Adapter** | Marinco S30-15 | $45 | An adapter to allow circuit analyzer to be plugged into a shore power pedestal. |
| **Precision Flush Cutter** | Klein D275-5 Pliers | $13 | For *clean* cuts on cable-ties and smaller-gauge wire. |
| AC/DC Clamp Meter | Fluke 325<br>**-OR-**<br>equivalent | $378<br>**-OR-** | AC/DC current, voltage, frequency etc. Necessary for full diesel engine diagnostics |
| Wire and Cable Cutter | Ancor 703005<br>**-OR-**<br>Klein 63050 | $19<br>**-OR-**<br>$30 | For clean cuts on larger wire. |
| Alligator Clip Test Leads | | $10-$15 | Useful for troubleshooting and prototyping. Make sure they are at least 16-gauge wire. |
| Mil. Spec. Zinc Reference Electrode | Electro-Guard RP-2 | $98 | Used when measuring galvanic activity during corrosion survey data collection.<br>*Note: Not needed until 3rd Quarter. Talk to an instructor after Oct. 5th – a discount may be available.* |

## Mechanical Tools

Note: If you already have a set of wrenches and sockets and screwdrivers and so on, use what you have. Also, good storage solution (a toolbox/bag) is important to keep everything together.

If you are just starting to build a tool kit, buying a packaged set like those listed below takes a lot of the guesswork out of the process. The case helps to keep things organized and offers a nice, portable storage solution. Buying tools at garage sales is also viable but piecing a whole kit together could take some time.

When it comes to torque wrenches, buy a good one that comes *with a certificate*. These tools are calibrated, and if you buy a cheap one or buy second-hand, there's no guarantee that it's still accurate.

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| Tool | Model | Price | Notes |
|---|---|---|---|
| **Metric and SAE inch sockets, regular and deep, 1/4" and 3/8" drive** | DeWalt DWMT73801<br>108 Piece Set | $80 | There are a lot of comparable kits out there; invest in a good one. It may not seem like a lot of tools in there, but a kit like this will take care of a large portion of your wrenching needs.<br>The set listed comes with a blow-molded case, which is very nice if you don't have a place to put 100+ bits & pieces.<br>Don't be afraid to mix and match smaller kits if you don't purchase this set. |
| **Metric and SAE Allen wrenches** | Eklind 13222<br>SAE & Metric | $26 | |
| **Metric Open Ended Wrenches** | Crescent CCWS5-05 | $65 | |
| **SAE Open Ended Wrenches** | Crescent CCWS4-05 | $65 | |
| **1/4" Drive Torque Wrench** | TEKTON 24320 | $50 | 20-200 inch-*pound* torque range |
| **3/8" Drive Torque Wrench** | TEKTON 24330 | $50 | 10-80 *foot*-pound torque range |
| **Screwdriver Style Torque Wrench** | Craftsman CMHT68130<br>**-OR-**<br>Wheeler F.A.T. Wrench | $70<br>**-OR-**<br>$55 | 10-50 *inch-pound* torque range |

## Mechanical Tools – *Continued*

| Tool | Model | Price | Notes |
|---|---|---|---|
| **10" Pliers** | Channellock 430<br>**-OR-**<br>Knipex Cobra Water Pump Pliers 8701250 | $19<br>**-OR-**<br>$40 | |
| **Diagonal Cutters** | Klien | $25 | For example, Klien D248-8. |
| **10" Adjustable Wrench** | Crescent | $17 | Other brands are available. The 10" is required; other sizes are optional. |
| **6" Needle Nosed Pliers** | Irwin 6" long-nose pliers | $10 | Indispensable tool for fine manipulation. |
| **Multi-Bit Screwdriver** | Megapro | $25-45 | The 15-in-1 is a good option. Compact and capable of many jobs. |
| **Feeler Gauge set** | GEARWRENCH 161D | $10 | Used to precisely measure very small gaps between parts. Get a set marked with both metric and SAE (or one of each). |
| **Thread Pitch Gauge SAE/Metric** | Tekeviss Thread Checker<br>**-OR-**<br>Boenzone Nut & Bolt Thread Checker<br>**-OR-**<br>Parker Thread ID Kit | $19<br>**-OR-**<br>$10<br>**-OR-**<br>$70 | Used to identify screws and bolts, including length, diameter, and thread pitch.<br>*Note: Contact an instructor for purchase information for the Parker Thread ID Kit.* |
| **Cordless Drill Set** | Makita CT225SYX | $190 | A good cordless drill motor is a very frequently used tool. Most sets will include a drill and an impact driver. Be sure to get one that includes a battery and a charger – rather than "tool only." |
| **Hole Saw Kit** | Milwaukee 49-22-4105 | $160 | |
| Carbide Scraper | Titan 17016<br>**-OR-**<br>Performance Tool W944 | $25<br>**-OR-**<br>$29 | Used to remove gaskets and clean up sealing surfaces. |
| Dead Blow Hammer | Harbor Freight<br>2 lb. or 3 lb. Head Weight | $10-12 | Softer-headed mallet filled with sand or shot for low-bounce percussive persuasion. Other sizes also available. |
| Adjustable Wrenches: 12" and 18" | Crescent 12"<br>**AND**<br>Crescent 18" | $15-30<br>**AND**<br>$25-40 | |
| Mini Combination Wrenches | DuraTech mini wrench set | $20 | Smaller-sized wrenches for little stuff and tight spaces. |

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## Layout Tools

| Tool | Model | Price | Notes |
|---|---|---|---|
| **Tape Measure – 16' or 25'** | | $10-20 | A 16' or 25' tape is a good length for most purposes. |
| **Scratch Awl** | Stanley 69-122<br>**3-pack set** | $27 | Can scratch layout lines, punch index holes for drilling, and so on.<br>*Note: purchase a 3-pack set; you will be using more than one.* |
| **6" Combination Square** | Irwin, Arrow, Swanson, or similar | $10-15 | Irwin, Arrow, Swanson, or similar are good entry-level options and are sufficient for the program.<br>If you prefer a high-precision tool, Starrett ($125) is a high quality option. |

## Other Tools

| Tool | Model | Price | Notes |
|---|---|---|---|
| **Box Cutter, Retractable/Foldable** | | $10 | All-purpose utility knife (for example, Stanley 10-499). |
| **Drill Bit Set** | DEWALT DWA1181 Fuller Set | $20 | 1/16" to ½", 21 pieces. A decent general-purpose set of drill bits. |
| **Digital Caliper** | iGaging | $40-50 | Used to take inside and outside measurements. Minimum 0-6" size with inch and metric measurements. |
| Ball Peen Hammer | XtremepowerUS 1-Pound 15145-XP | $20 | Dead blow hammer with metal faces. |
| Small Parts organizer | Plano 23705-00 | $10 | Useful for organizing fasteners and other small parts. |
| Headlamp and/or Flashlight | | $15-$45 | A small battery-powered work light or flashlight is great, too. Rechargeable is nice. |

**Tool Tip:**
Think of a way to identify your tools – it could be spray paint or a paint pen or an engraving tool. Permanent marker will likely wear off. Many of you will have identical tools and each of you should figure out a recognizable way to mark all the bits and pieces. These tools are an investment and should be protected as such!

## Personal Protective Equipment (PPE)

We strive to establish good safety habits in the shop that you will take out into the workplace. Having PPE that is comfortable and works well makes those habits much easier to put in place, and shop safety is part of your grade!

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| Tool | Model | Price | Priority |
|---|---|---|---|
| **Safety Glasses**<br>**-OR-**<br>**Goggles with Side Shields** | | $10-$20 | Find a comfortable pair, so you get into the habit of wearing them. If you already wear glasses, get something that fits comfortably over them. |
| **Hearing Protection:**<br>over-ear or ear plugs | 3M Pro-Grade Earmuff<br>90565-4DC-PS<br>(over-ear) | $10-$30 | Noise is harmful and exhausting. A good pair of over-ear muffs is recommended. Go for a high Noise Reduction Rating (NRR) – 30dB or greater.<br>Ear plugs are good for protecting hearing, but they tend to get lost and are not as environmentally friendly. |
| **Dust Masks**<br>Non-Vented | 3M 8200 N95 (20 pack)<br>**-OR-**<br>3M 8271 P95 (10 pack)<br>**-OR-**<br>Honeywell RWS-54001<br>(50 pack) | $13<br>**-OR-**<br>$45<br>**-OR-**<br>$15 | Go for R95 (somewhat resistant to oil) or P95 ratings (strongly resistant to oil). The P95 will be more expensive but will have a longer life. The familiar N95 masks are OK for particulate but are not oil resistant. |
| **Dual Cartridge Organic Respirator Mask** | 3M 53P71 | $28 | This is for protection against organic vapor (usually evaporating solvents). These usually come in small/medium/ large. We will review basic fit-test procedures in class. |
| **Nitrile Gloves** | | $25-$35 | Latex gloves don't stand up to solvents as well as nitrile. There's a lot of variation in fit (we have some samples). |
| Long-sleeve Coveralls | | $30-$50 | For dirty work |